The background of the slide features a vibrant, abstract painting with a textured, brush-stroked appearance. The colors are a mix of blues, yellows, reds, and purples, creating a dynamic and expressive composition.

# **APS360**

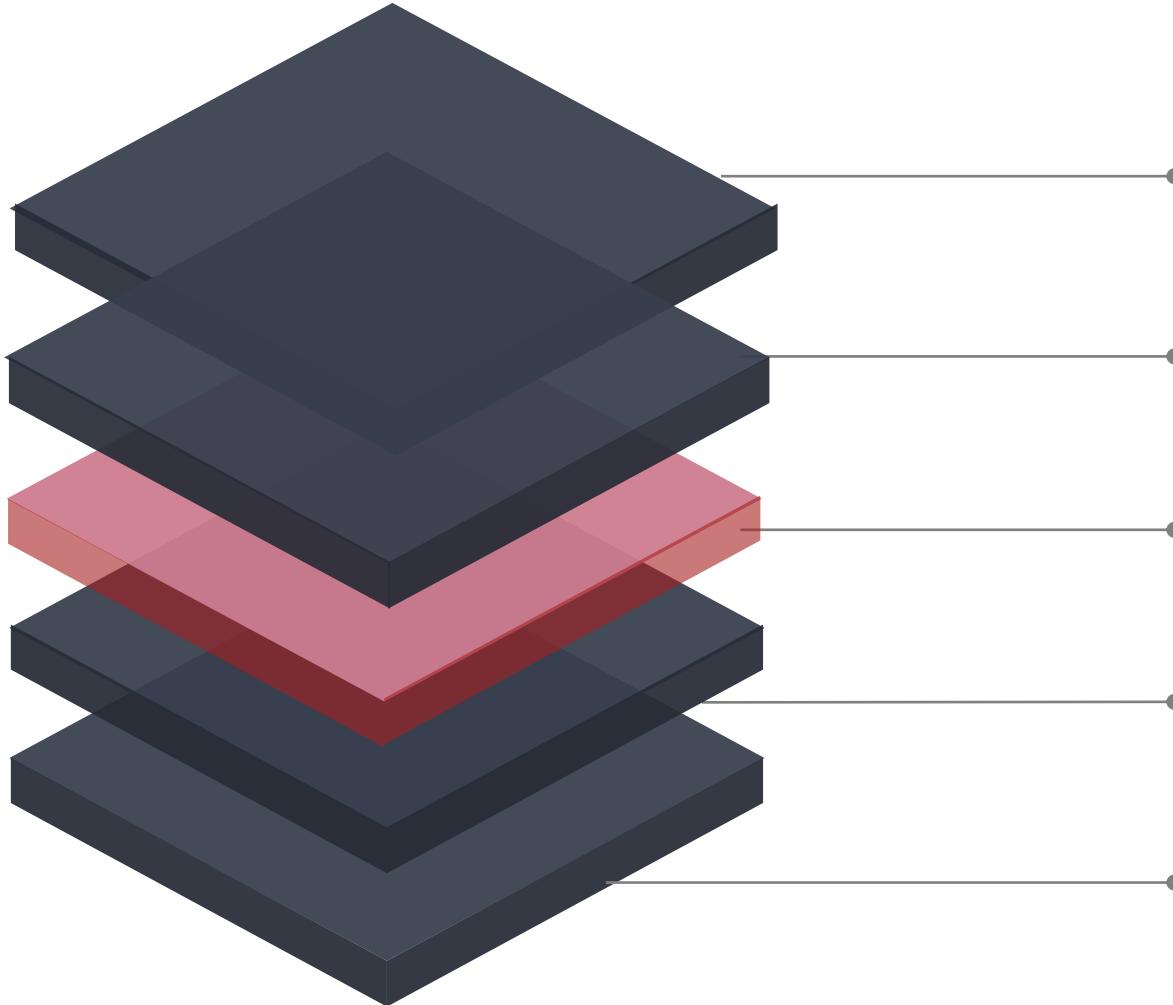
## **Art Style Classification**

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**Ruiyang Li 1003961144**

**Zhuoning Li 1003215184**

# Today's Agenda



## Problem Statement

Problem Overview → Art Styles → Proposed Solution

## Data preparation

Data Collection → Data Preprocessing

## Model Development

Baseline Model → Primary Model → Demo

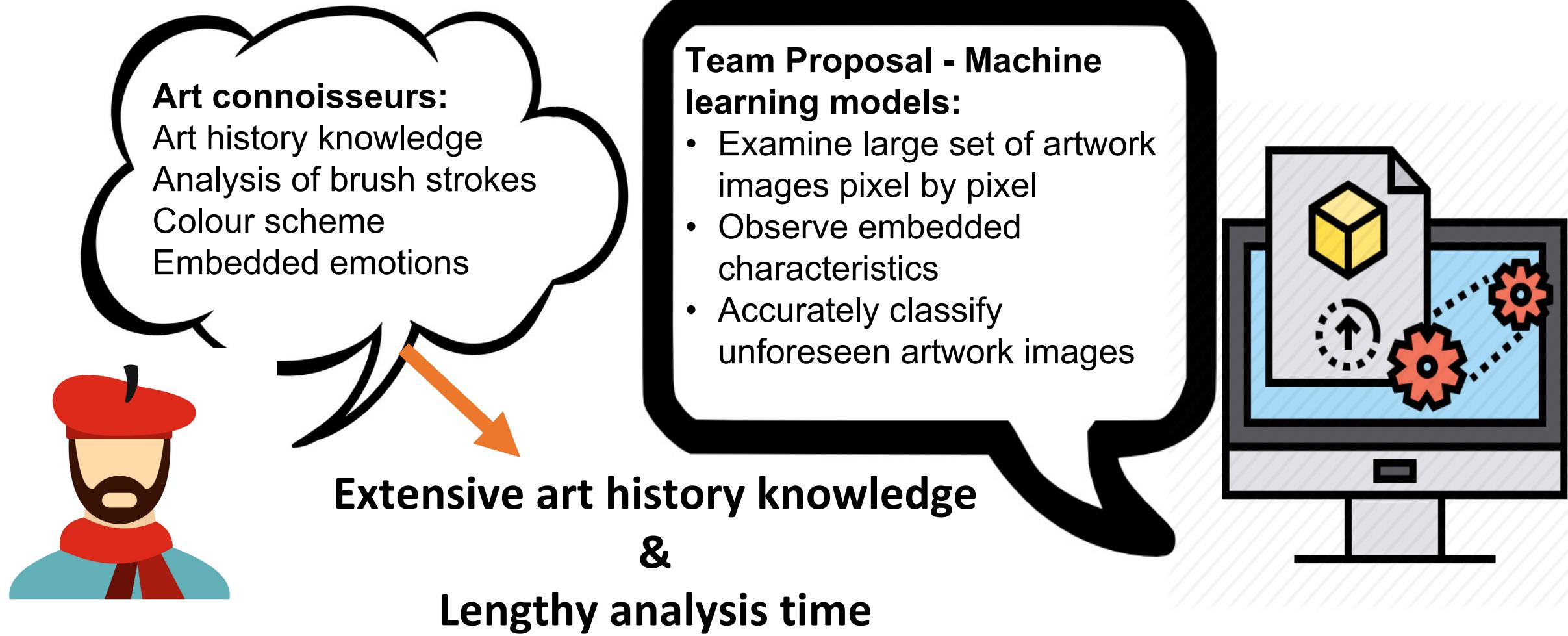
## Final Results Demo

Quantitative → Qualitative

## Conclusion

Takeaways

# 01 Problem Statement



## 02 Art style 101

**Expressionism:** express emotion and meaning rather than reality

**Realism:** show exact details of everyday life, similar to photograph

**Impressionism:** use shorter brush strokes to convey the fleeting sights offered by changing light

**Romanticism:** adds imaginary features to bring them closer to the notion of perfection



Realism

Romanticism

Impressionism

Expressionism

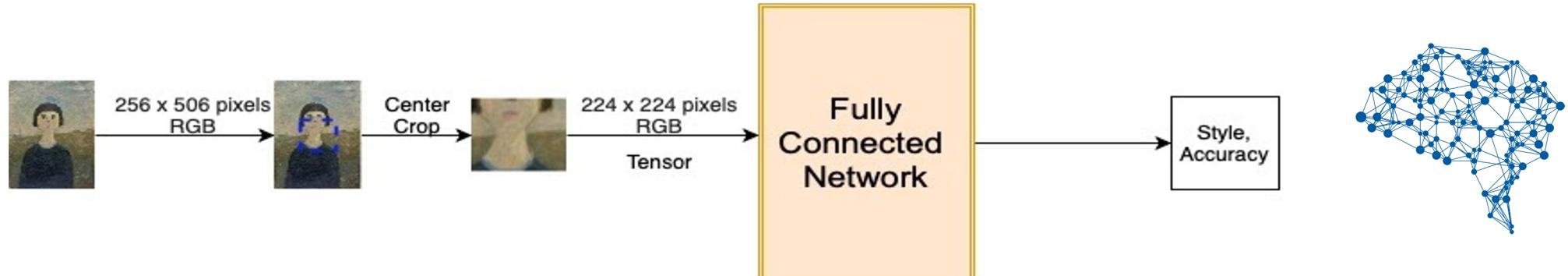
# 03 Dataset and Data Preprocessing



“Painter by Numbers”

Art Style	Training Set #	Validation Set #	Testing Set #
<b>Portrait_Expressionism</b>	944	220	350
<b>Portrait_Impressionism</b>	944	235	350
<b>Portrait_Romanticism</b>	944	235	350
<b>Portrait_Realism</b>	944	254	350

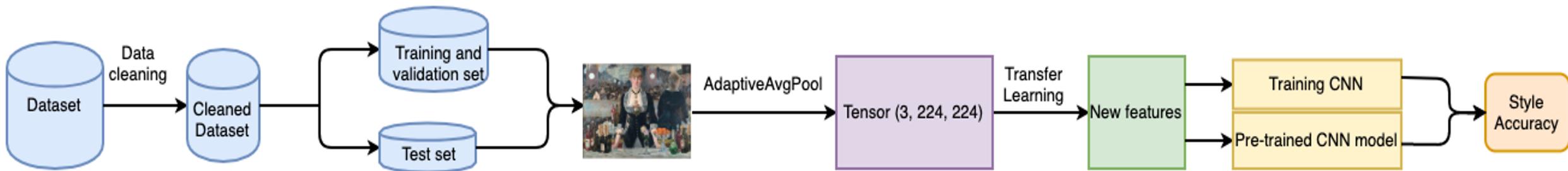
# 04 Baseline Model



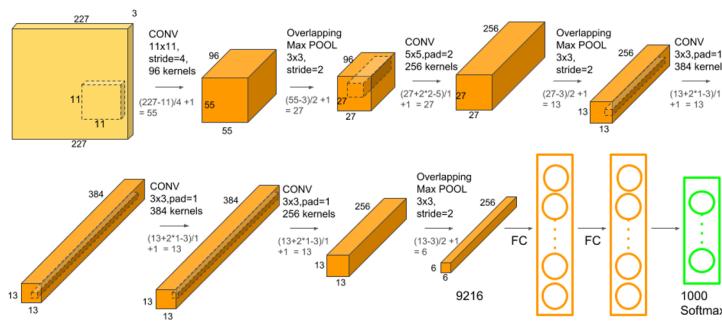
Parameter	Setting	Comment
Input Size	224 x 224 x 3	RGB images with height and width of 224
Number of Layers	2	
Hidden Units	50	
Optimizer	Stochastic Gradient Descent	Allows global search for an optimum
Criterion	Cross-Entropy	Multi-class classification problem
Batch Size	32	
Number of Epochs	15	
Learning Rate	0.001	

Achieved a baseline accuracy of 0.4

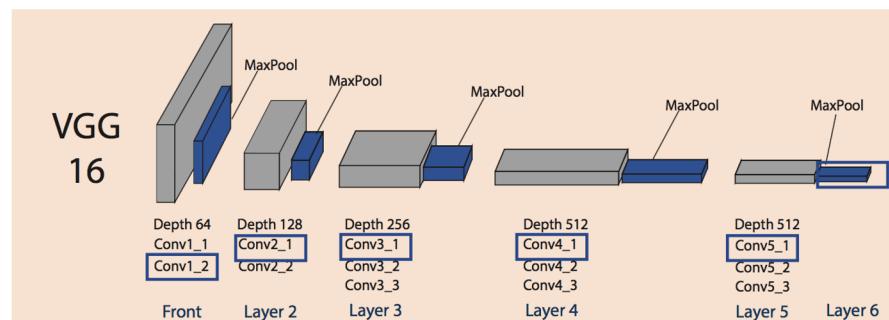
# 05 Primary Model



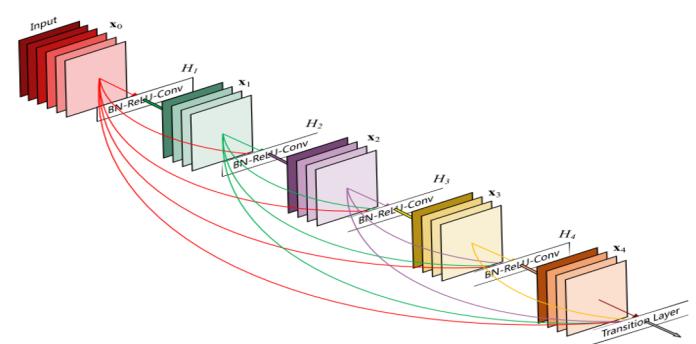
AlexNet



VGG 16



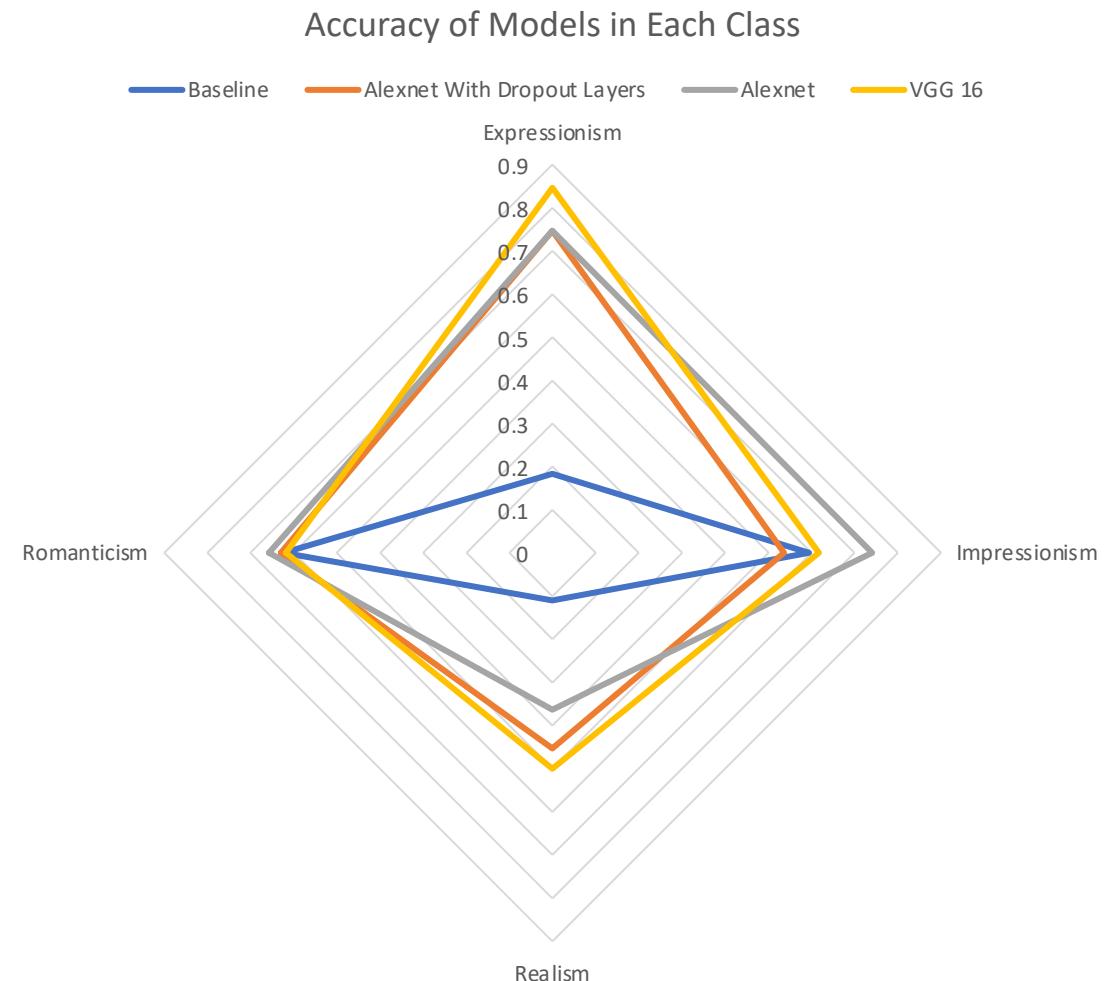
ResNet



# Model Demo

# Quantitative Result - Accuracy

Model	Accuracy
Baseline	40%
Alexnet With Dropout Layer	55.9%
Alexnet	64.2%
VGG 16	63.8%

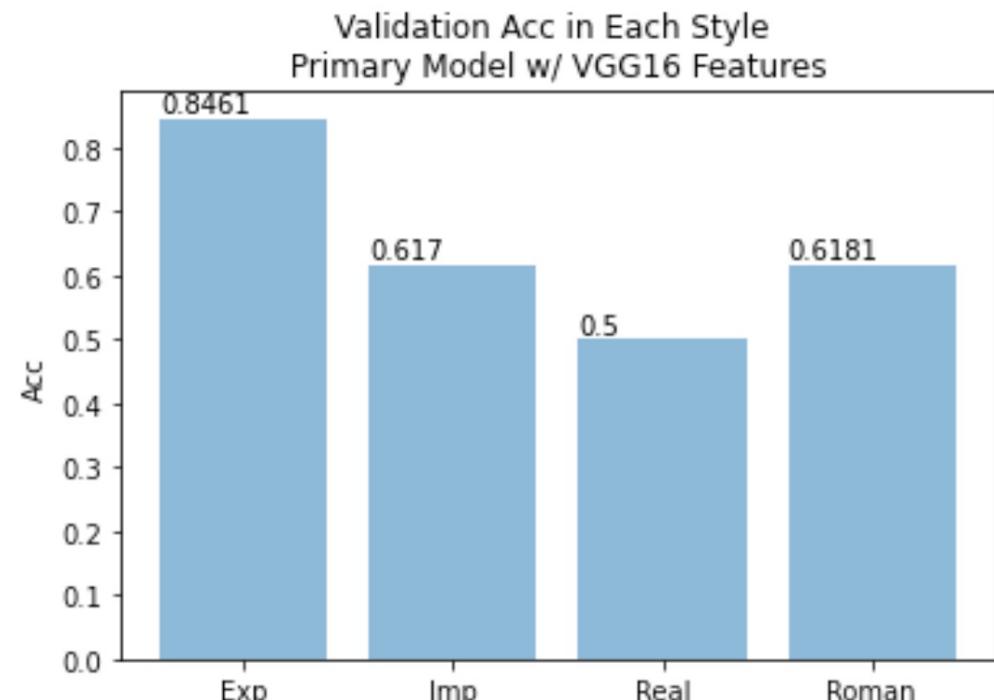


# Quantitative Result - Confusion Matrix

Predict Actual \ Predict	Portrait Expressionism	Portrait Impressionism	Portrait Realism	Portrait Romanticism	Total
Portrait Expressionism	<b>165</b>	<b>39</b>	<b>10</b>	<b>7</b>	<b>221</b>
Portrait Impressionism	<b>15</b>	<b>174</b>	<b>28</b>	<b>18</b>	<b>235</b>
Portrait Realism	<b>19</b>	<b>69</b>	<b>85</b>	<b>61</b>	<b>234</b>
Portrait Romanticism	<b>7</b>	<b>44</b>	<b>36</b>	<b>167</b>	<b>254</b>
Total	<b>206</b>	<b>326</b>	<b>159</b>	<b>253</b>	<b>944</b>

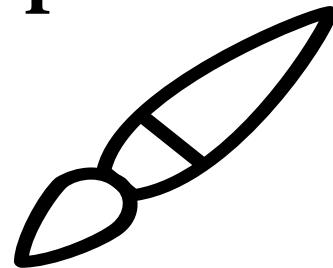
## What Confused Our Model?

Looking at the accuracy by class and the confusion matrix, the model is not good at distinguishing Realism & Impressionism, and Realism & Romanticism



## Investigation on the model's weakness

### Realism VS. Impressionism



Realism painting tends to show exact details, similar to a photograph, whereas Impressionism tends to use shorter brush strokes to convey the fleeting sights offered by changing light.

The model is inaccurate in identifying the difference in brush strokes and texture of the painting; and whether the subject has mythological/ imaginary features in it.

### Realism VS. Romanticism



Realism painting strives to depict authentic people and events in ordinary life, whereas Romanticism elevates these subjects and adds mythological and imaginary features to bring them closer to the notion of perfection.

## Benefits:

- Accurate art style classification
- Free art connoisseurs from time-consuming artwork analysis processes

## Limitations:

- Dependent on historical artistic styles
- Lack emotions and art-related background knowledge